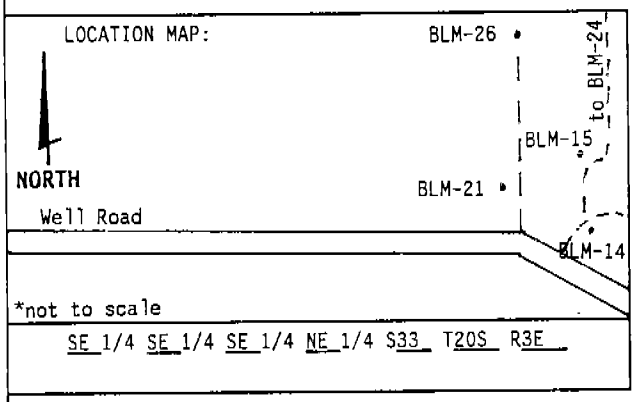
LITHOLOGIC LOG



SE 1/4 SE 1/4 SE 1/4 NE 1/4 S33 T20S R3E

SITE ID: NASA-WSTF LOCATION ID: BLM-26-404

SITE COORDINATES (ft.):

N 230627.14 E 408641.42

GROUND ELEVATION (ft. MSL): 4664.97 (B.C.)

STATE: NEW MEXICO COUNTY: DOÑA ANA

DRILLING METHOD: Mud Rotary/Air Foam Rotary

DRILLING CONTR.: Larjon Drilling Co.

DATE STARTED: 10/10/91 DATE COMPLETED: 11/05/91

FIELD REP.: M. Canavan

COMMENTS: Drill mud rotary 0'-62'(12¼" mill tooth). Ream to 16". Install 62' of 10" surface casing. Drill 62'-462' air foam rotary (9 7/8" mill tooth). Tuff Bedrock at 310' - 405'. Rhyolite bedrock from 405' - TD (Total Depth). TD = 462'.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
			Logged by driller	Cuttings at 5' intervals 0'-462'	
5			7		
10			25		
15			32		
20			18		
25			28		
30			9		
35			11		
40			42		
45			35		
50			31		

0'-310' Alluvium (Santa Fe Group): Individual clasts vary widely in color. Clay content imparts a pale reddish (10 R 5/4) color to samples. Washed samples are multicolored. Cuttings range in size from less than .10" to 1.0" and are angular to rounded. This wide range is due to cutting vs. alluvial clast size and shape. Alluvium is considered to be an unconsolidated to partly consolidated polygenetic pebble to boulder conglomerate. Several clay-rich zones are noted below. Limestone is the dominant lithology to 295'. Volcanic cuttings predominate to 310' in volcanic-rich alluvium. Clast lithologies in decreasing abundance are: dark gray to grayish black (N3-N2) limestone (mudstone to sparite, often white calcite-filled fractures); volcanics, including a variety of white to grayish orange (10 YR 7/4) rhyolites, granites and andesites; non-laminated to laminated greenish gray (5 G 6/1) and grayish-red (5 R 4/2) siltstones; and quartzites, pale yellow brown (10 YR 6/2) to gray (N6) chert, and macrocrystalline quartz. Minor amounts of brownish gray (5 R 4/1) quartz sandstones are also present. Caliche exists as very pale orange (10 R 8/2) clasts, cement, and grain coatings.

0'-5' Cuttings are angular to sub-rounded and range in size from .05" to .5".

5'-10' Less than 5% clay.

10'-15' Significant increase in clay %. Remainder of cuttings are bimodal in size distribution (≈ .5" and .10").

15'-20' Clay content is less than 10%.

25'-30' Clay-rich zone. More rounded grains.

45'-50' Less than 10% clay.

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
50			31		
55			40		
60			32 (to 62') 62'-462' Drill times recorded by 6 drillograph		
65					
70			3		
75			2		
80			3		
85			2		
90			3		
95			3		
100			3		
105			4		105'-110' Less than 10% clay present.
110			3		
115			3		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
115			3		
120			3		
125			4		
130			5		130'-135' Some sandstone present.
135			4		
140			4		
145			4		
150			3		
155			5		
160			3		
165			3		
170			5		
175			5		
180			5		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
180			5		
185			5		
190			6		
195			3		
200			6		
205			6		
210			6		210'-215' Cuttings are fairly uniform in size, average .10", and are angular to subrounded.
215			6		215'-220' Cuttings range from .10" to .5" and are subangular to subrounded.
220			6		220'-225' Cuttings are very uniform in size and average .10".
225			18		
230			8		
235			16		
240			11		240'-245' Calcareous cementation evident.
245			22		

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Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
245			22		
250			35		250'-255' Sample is fine grained; average cutting size is .05".
255			29		
260			14		
265			23		
270			17		
275			55		
280			23		
285			21		285'-290' Well sorted gravel. Grain size averages .20". Well cemented alluvium or tuff? present (≈ < 5% of sample).
290			37		290'-295' Significant increase in well cemented alluvium.
295			24		295'-310' Volcanic-rich alluvium. 10% white clay balls. Unit includes gold rhyolite, and variety of tuffs/rhyolites, and andesite. Grains are angular to rounded.
300			19		
305			13		
310			3		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
310			3		310'-405' Vitric Crystal Tuff: Yellowish gray (5 Y 7/2) to greenish yellow vitric crystal tuff with biotite and plagioclase phenocrysts. Biotite phenocrysts make up 10% of unit and are present as books (up to .03" long) and individual flakes. Plagioclase phenocrysts are large (up to .05" in diameter), but difficult to discern in whitish ground mass. Ground mass is devitrified and powdery in appearance, making the cuttings soft and friable. The cuttings are rounded and range from .08" to .5" in diameter. Angular flakey cuttings of gold rhyolite are present as well as andesite and miscellaneous rhyolites.
315			4		
320			4		
325			5		325'-330' Increase in greenish coloration. Possibly due to epidote replacing mafic minerals. Iron staining also present. Also present is a clear greenish gray - almost obsidian-like glassy rock with ?hornblende phenocrysts.
330			12		
335			11		330'-340' Gradual increase in percent of dark green cuttings.
340			7		
345			8		340'-360' Volcanic glass - pale greenish yellow (10 Y 8/2) to dusky yellowish green (10 GY 3/2) cuttings. Ground mass is glass with 1-2% biotite books and possibly hornblende phenocrysts. Some possible cleavage planes evident, indicating presence of plagioclase (clear). Mafic phenocrysts range from less than .05" to .10". Lithic fragments were not evident.
350			6		
355			6		
360			3		360'-385' Decreasing percentages of green glass cuttings with increasing white to pinkish devitrified vitric tuff. Biotite phenocrysts present as individual flakes and books (2%). Lower part of green glass unit is brecciated with some nearly black clasts cemented ? with white calcite.
365			3		
370			3		
375			3		

Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
375			3		
380			4		
385			7		385'-405' Devitrified gold, pink, and whitish vitric tuff. 1-2% mafic phenocrysts are probably biotite.
390			6		
395			4		
400			4		400'-405' Brick red volcanic appears in cuttings. Foam turns pink.
405			4		405'-462' Rhyolite Porphyry: Grayish red (5 R 4/2) to dusky red and grayish orange (10 YR 7/4) rhyolite porphyry. White plagioclase phenocrysts up to .10" in diameter make up 15% of the rock. Biotite books from less than .05" to .05" in length comprise 5%-10% of the rock. Large (≈ .05') quartz phenocrysts make up less than 1% of the rock. The reddish ground mass appears to be holocrystalline. Flow banding is not apparent. The formation is hard and some evidence for fracture-filling calcite exists. Cuttings are angular and range from .05" to .4" in diameter. Some gold rounded cuttings of overlying tuff are present.
410			21		
415			18		
420			8		
425			10		
430			19		
435			27		
440			14		

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Depth	Visual %	Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
				Cuttings (cont'd)	
440			14		
445			15		
450			21		
455			19		
460			20 24 (to 462')		
465					
470					
475					
480					
485					
490					
495					
500					
505					